Naval Space at the Forefront of Transformation

Bringing New Capabilities to the Joint, National, Naval Warfighter

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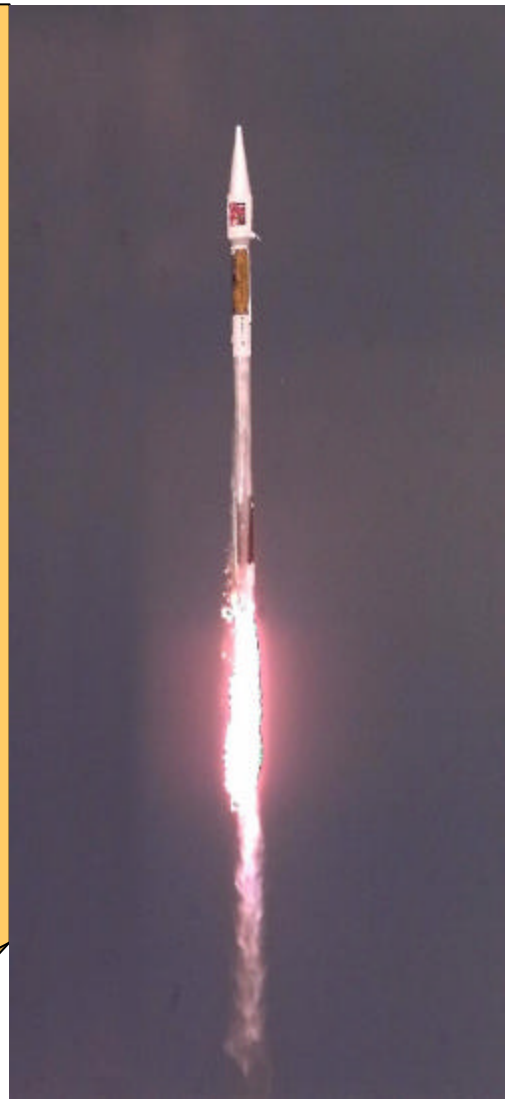
Naval Space – A Rich History

Naval History in Space

- U.S. Naval Observatory: 1830
- NRL: Rocket development: Oct 1945
- NRL: Launched V-2 rockets in 1946
- First VIKING launched 1949
- NRL: launched VANGUARD Mar 1958
- GRAB: First reconnaissance satellite July 1959
- Navy part of original NRO in 1962
- Developed TRANSIT, NAVSAT, GPS navigation satellites (1960's -1970's)
- NRL: 1st Tactical Broadcasts from Space (TADIX-B)
- Established UHF SATCOM program in 1970's: FLTSATCOM; LEASAT; UFO
- NRL: Clementine – on orbit mapping Jan 1994
- Continuous participant in NASA's Astronaut Program/manned space flight



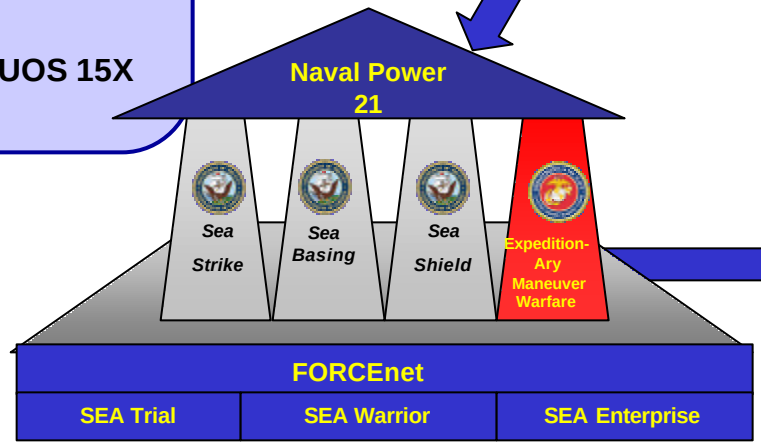
Space Capabilities: At the Core of DoD and Naval Transformation

GLOBAL INFORMATION GRID
- GIG-Bandwidth Expansion - JTRS
- GCCS - Transformational Comms

NATIONAL SPACE SYSTEMS
- Global Positioning - Communications
- Intelligence - Reconnaissance
- Surveillance - Environmental
- Space Control

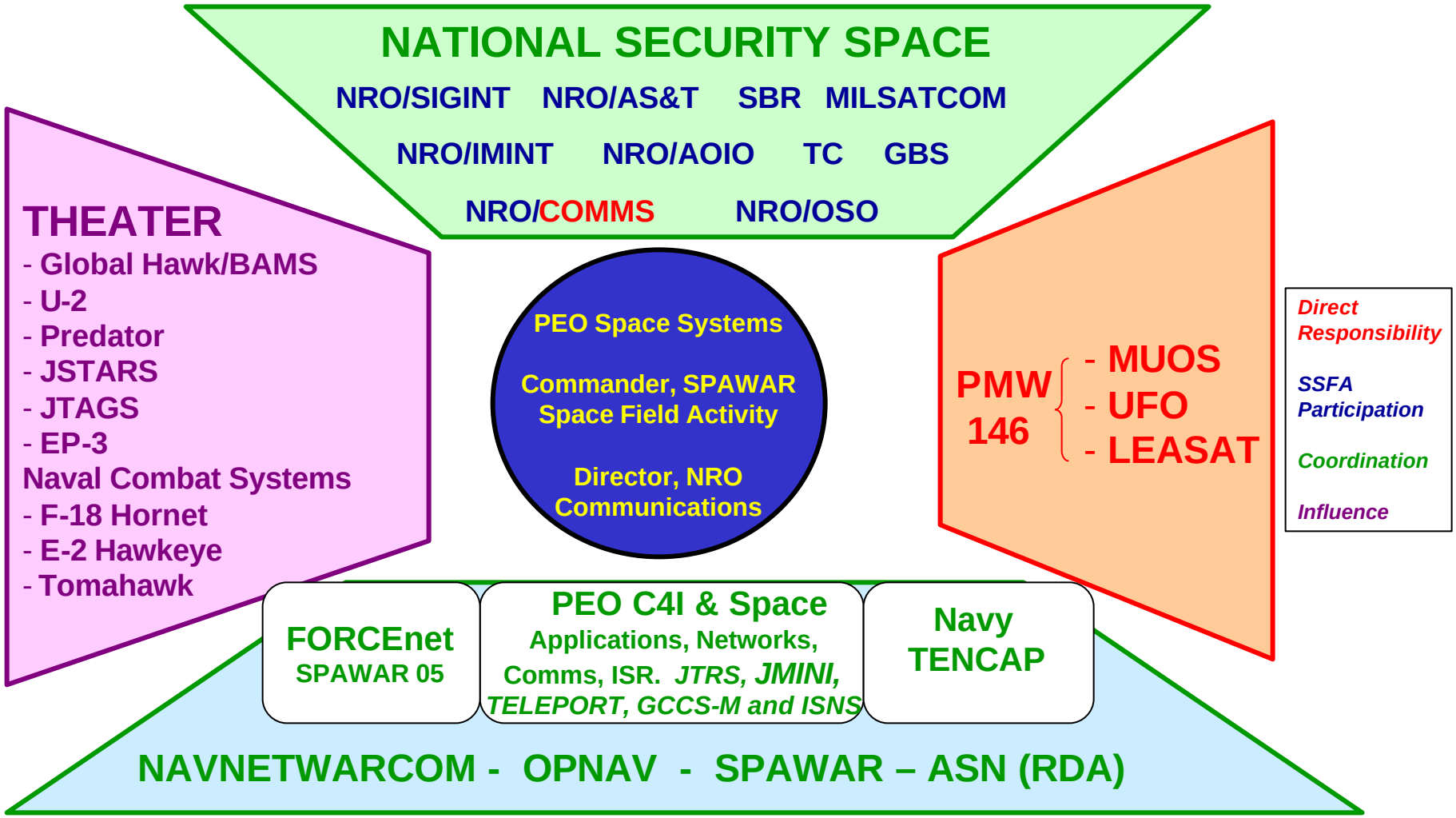
TRANSFORMATIONAL COMMUNICATIONS
- USAF, NRO, NASA
- Bandwidth Capacity Increase
- Protected 10X
- Wideband 10X
- Narrowband : MUOS 15X

TACSAT
- Established by Office of Force Transformation
- NRL is S&T Partner
- Responsive Payloads for all Combat Users
- Demos until 2011



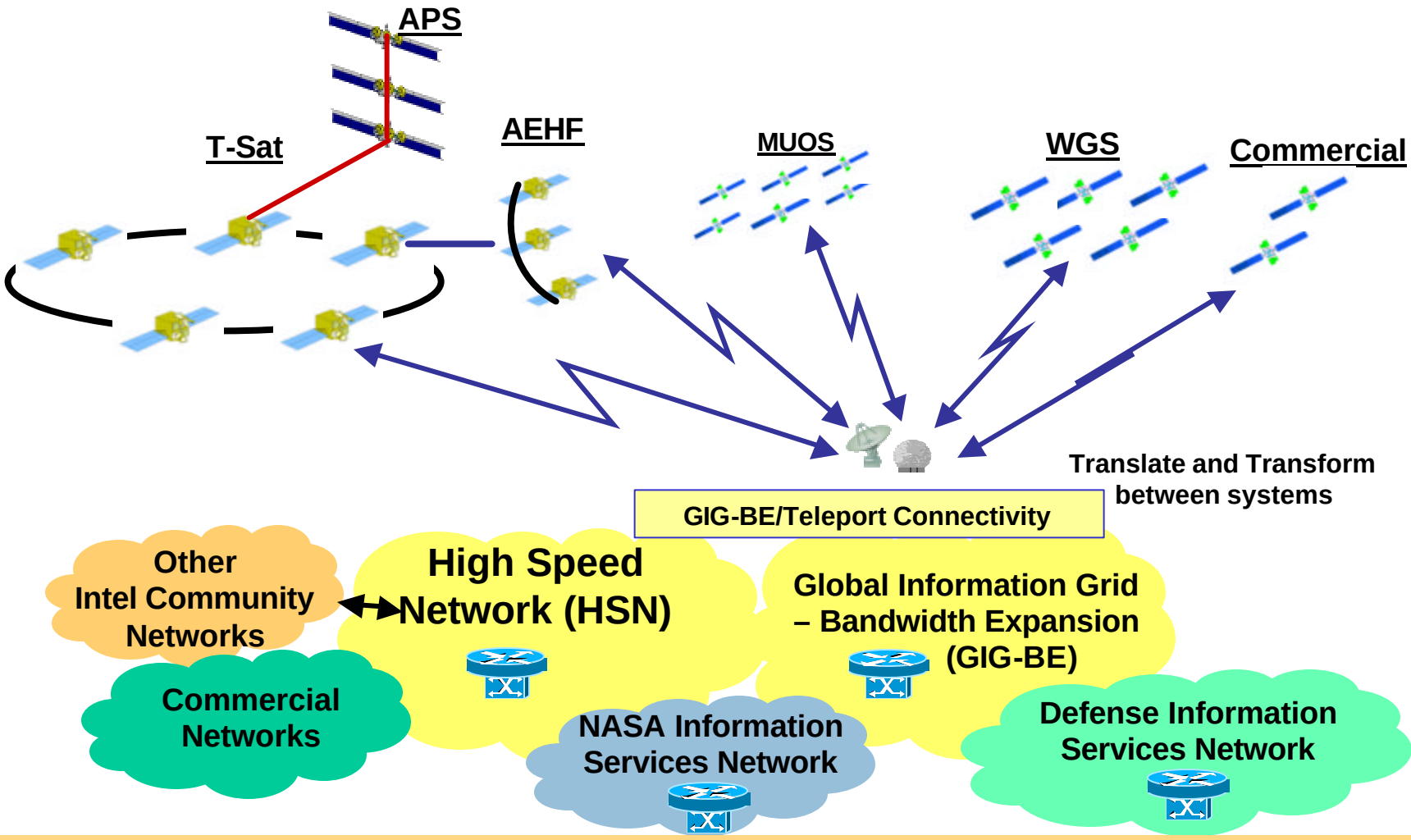
Naval strategy shifting from threat-based, platform-centric to effects-based, network-centric force

Naval Space Organizations Facilitate Leveraging, Coordination and Integration



PEO Space Systems announced May 2004

AEHF – MUOS – WGS Connect to TCA Network via Teleports



Universal reach through End-to-End network connectivity

MUOS

Net-Centric

- **MUOS provides/supports**:
  - ✓ **Internet protocol**
  - ✓ **Secure and available communications**
  - ✓ **Only handle information once**
  - ✓ **Post in parallel**
  - ✓ **Smart pull (vice smart push)**
  - ✓ **Data centric**
  - ✓ **Application diversity**
  - ✓ **Assured sharing**
  - ✓ **Quality of service**

ForceNet

- **MUOS provides/supports**:
  - ✓ **Internal and external Communications and Data Networks through DISN Teleport interface**
  - ✓ **Communications Infrastructure**
  - ✓ **Network Protection**
  - ✓ **Network Synchronization**
  - ✓ **Information Transfer**
  - ✓ **Intel, Surveillance, and Reconnaissance by providing a communications link between users both internal and external to battlespace environment**

MUOS born Net-Centric and ForceNet compliant

Navy is OSD Executive Agent for Narrowband SATCOM

Mission

- Command and control interoperability between the Combatant Commanders and their components
- Connectivity for command and control of tactical forces
- Connectivity for deployed Special Operating Forces
- Connectivity supporting rapid deployments of land, air, and naval forces worldwide
- Connectivity for tactical communications in all operating environments

Circuits
Command and Control
Fire Support
Combat Operations
Search and Rescue
Tactical Data Links
Broadcast
Cruise Missile/UAV
Control/Data Links
Logistics

Tactical Circuit supporting joint and allied forces

Users
Navy
Marines
Army
Air Force
Allies
Unified CINCs
JTF
Gov't Agencies

Over 50 percent of SATCOM users are deployed via UHF

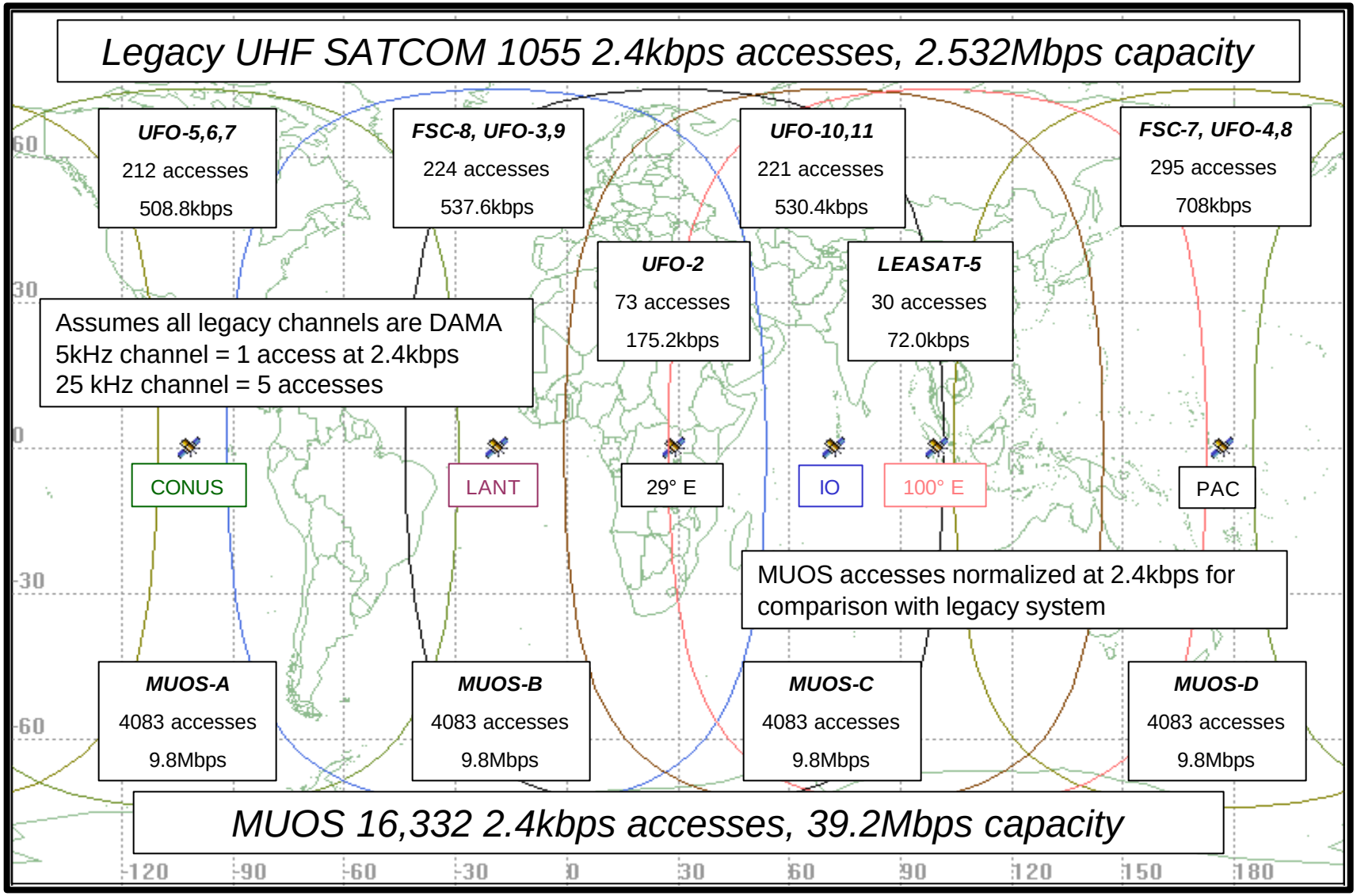
Terminals
AN/PSC-5 SPITFIRE
CSEL
URC-133 Federated
ARC-210
WSC-3
Digital Modular Radio/Joint Tactical Radio System (JTRS) (future)

More than 50 different types and over 18,000 terminals in-service today!

"Narrowband satellite links are the only reliable means of communication for many tactical warfighters."

VADM H. A. Browne
USDEPCINCSPACE
SWarF 2000 Interim Report dtd 18 Jul 00

Legacy UHF and Notional MUOS as of September 2004 with UFO-11 Tailored



NRO Mission

"The NRO develops and operates unique and innovative space reconnaissance systems and conducts intelligence-related activities essential for U.S. national security"

NRO Vision

Freedom's Sentinel in Space
One Team,
Revolutionizing Global Reconnaissance

Naval-National Security Space Partnership - Critical to Achieve Naval Power 21 Objectives

NRO

- Dominated by Air Force and civilian elements
- Navy presence has evolved from a single program to participation across entire organization
- Permits leveraging and two-way interchange of ideas
- SPAWAR Space Field Activity established 1999 to manage naval presence in NRO (198 Mil; 102 Civ)

Naval-NRO Coordinating Group (NNCG)

- Also established 1999
- Promotes Navy awareness of National Security Space programs and processes
- Ensures Navy needs considered in National Security Space program planning, development and acquisition
- Goal is to close warfighting gaps
- Introduces National Space Capabilities into the Naval Capabilities Development Process (NCDP)

Other National Security Space

- Navy presence increasing in National Security Space Office and in most joint space program offices

What is Navy TENCAP?
Tactical Exploitation of National Capabilities

- Chartered by Congress
- Navy R&D center for space-based ISR
- Under OPNAV N6 / N7
- Primary Navy interface with NRO
- Navy lead for 3 space-related ACTDs
  - SEI, BFT, SMTI
- Key Navy POC for future ISR satellites
  - FIA, IOSA, SBR, SBIRS, etc.
- ***Focus is on solving tactical Fleet problems***

Navy TENCAP Mission: *Rapidly develop Prototype Systems, Sensors and Software that exploit National Space Reconnaissance in support of US Naval Forces*

TACSAT: Transforming Responsive Space

Sponsored by Office of Transformation (OFT)

TACSAT Provides

Combatant User Call-up;
Prep/Launch with payload designed to meet gaps;
Rapid Initialization;
Real-time Theater tasking;
High Bandwidth Theater Downlink to Users,
providing Information to the Warfighter via SIPRNET

– ***All in less than 7 days!***

TACSATs under consideration for launch to meet capability shortfalls

naval mine detection;
camouflage penetration;
imagery gaps;
special communications;

Office of Naval Research / Naval Research Lab partner with

- **AFSPC (Air Force Space Command)**
- **AFRL (Air Force Research Lab)**
- **SMC (Space and Missile Command)**
- **NRO (AS&T)**
- **Army**

Naval Space – at the Forefront of Transformation

- MUOS
  - Key element of GIG, TC and FORCEnet
- Leveraging National Security Space (NSS) activities/programs, especially at the NRO
  - Providing Naval perspective to NSS
  - Ensuring new naval programs include capability to fully incorporate NSS
- FORCEnet
  - Bringing National Space capabilities to the Fleet and Joint Users
- NRL / TACSAT development
  - Real time theater tasking
- Navy TENCAP

Naval Space Leadership

Mr. John Young	ASN (RDA)
Dr. Gary Federici	DASN (Space, C4I)
VADM James McArthur	COMNAVNETWARCOM
VADM Joseph Sestak	N6/7
RADM Steven Tomaszeski	N61
RDML Rose Levitre	N61R
RDML Elizabeth Hight	N61C
CDR Maria Lyles	Navy TENCAP
RADM Jay Cohen	Chief of Naval Research
Mr. Pete Wilhelm	Naval Center for Space Technology, NRL
RADM Ken Slaght	COMSPAWARSYSCOM
RDML (Sel) Vic See	Commander, SSFA / Director, NRO Communications
CAPT Wayne Tunick	NNCG Chair
Mr. Dennis Bauman	PEO C4I & Space
Dr. William J. Breedlove, Jr.	(Acting) PEO Space Systems / Executive Director, SSFA